Psychiatric and Psychological Morbidity as a Function of Adaptive Disability in Preschool Children with Aggressive and Hyperactive-Impulsive-Inattentive Behavior

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Abstract:
Children with high levels of aggressive-hyperactive-impulsive-inattentive behavior (AHII; *n* = 154) were subdivided into those with (*n* = 38) and without (*n* = 116) adaptive disability (+AD/-AD) defined as a discrepancy between expected versus actual adaptive functioning. They were compared to each other and a control group of 47 normal children. Both AHII groups were more likely to have attention deficit hyperactivity disorder (ADHD), oppositional defiant disorder, and conduct disorder than control children; more symptoms of general psychopathology; greater social skills deficits; more parental problems; and lower levels of academic achievement skills. Compared to AHII - AD children, AHII + AD children had (1) more conduct disorder; (2) greater inattention and aggression symptoms; (3) more social problems, less academic competence, and poorer self-control at school; (4) more severe and pervasive behavior problems across multiple home and school settings; and (5) parents with poorer child management practices. Thus, adaptive disability has utility as a marker for more severe and pervasive impairments in AHII children.

KEYWORDS: Inattention; aggression; hyperactivity; ADHD; preschool children.

Article:
Hyperactive-impulsive-inattentive children, or those diagnosed as having attention deficit hyperactivity disorder (ADHD), have a significantly higher risk for the development of socially aggressive behavior, oppositional defiant disorder (ODD), and conduct disorder (CD) (Barkley, DuPaul, & McMurray, 1990; Barkley, Fischer, Edelbrock, & Smallish, 1990; Hinshaw, 1987; Loney & Milich, 1982). Children displaying this combined pattern of both high levels of aggressiveness and of hyperactive-impulsive-inattentive behavior (AHII) have markedly greater risks for a variety of psychological, academic, emotional, and social difficulties than do children having either behavior pattern alone (Hinshaw, 1987; Loeber, 1990; Pelham & Milich, 1984; Taylor, Sandberg, Thorley, & Giles, 1991). And the families of such children are often marred by significantly higher rates of socially aggressive behavior among other family members; more harsh, extreme, and unpredictable methods of child discipline; greater strife in marital interactions; and a greater risk of psychiatric disturbance in the parents (Barkley, Anastopoulos, Guevremont, & Fletcher, 1992; Lahey et al., 1988; McGee, Partridge, Williams, & Silva, 1991; Patterson, Dishion, & Reid, 1992; Stormont-Spurgin & Zentall, 1995).

Research following AHII children into later childhood and adolescence documents a markedly higher likelihood of persistence of their behavioral problems over time and a substantially greater risk for conduct

disorder, delinquent or criminal activities, academic achievement deficits, school behavioral problems and disciplinary actions, and substance experimentation, use, and abuse in this subgroup as opposed to children having only hyperactive-impulsive behavior (Barkley et al., 1990; Biederman, Faraone, Milberger et al., 1996; Campbell, 1987; Fischer, Barkley, Edelbrock, & Smallish, 1990; Mannuzza, Gittelman-Klein, Bessler, Malloy, & LaPadula, 1993; Satterfield, Hoppe, & Schell, 1982; Walker, Lahey, Hynd, & Frame, 1987; Weiss & Hechtman, 1993). Conversely, studies focusing upon children and adolescents with conduct disorder suggest that the early combination of hyperactive-impulsive behavior with social aggression in childhood is associated with significantly earlier onset of conduct disorder and antisocial behavior, greater diversity of delinquent activities, greater persistence of conduct disorder throughout adolescence, and a greater risk for substance use and abuse in adolescence (Hinshaw & Anderson, 1996; Loeber, 1990; Moffitt, 1990; Patterson et al., 1992). Taken together, these two bodies of literature consistently indicate that young children having high levels of both socially aggressive and hyperactive-impulsive behavior constitute an exceptionally high-risk population for later impairments in school, peer, and general adaptive functioning than normal children or those having only one of these patterns of early behavioral disturbance.

Several previous investigations have noted that children with ADHD experience significant deficits in adaptive functioning (Barkley, DuPaul et al., 1990; Roizen, Blondis, Irwin, & Stein, 1994) and that such deficit levels are comparable to those associated with pervasive developmental disorders (PDD) or mild mental retardation (MR) (Stein, Szumowski, Blondis, & Roizen, 1995). Adaptive functioning refers to the performance of the daily activities required for personal and social sufficiency (Sparrow, Balla, & Cicchetti, 1984). It represents the child's actual performance of the typical demands of daily living in their natural home and community settings. These often include self-help skills (i.e., dressing, bathing, feeding, self-care, etc.), independence (i.e., functions well about the home, yard, or community without supervision, respects property, etc.), self-knowledge (i.e., aware of one's own body and its parts, age, address, phone number, and other aspects of personal identity, etc.), motor skills (i.e., sits up, walks, balances, runs, buttons, zips, cuts with scissors, uses eating and writing utensils, etc.), social knowledge (e.g., recognizes and uses time and monetary units, major community resources such as police, fire department, etc.), and language/communication skills with others (i.e., identifies objects, obeys two-step commands, communicates using complete sentences, counts to 100, introduces self to others, etc.).

Roizen et al. (1994) found that the deficits in adaptive functioning in ADHD children were substantially below the children's levels of tested intelligence, often by as much as 1.5 to 2 standard deviations. In contrast, normal children may show only a small disparity averaging approximately 3 standard score points between intelligence or general cognitive ability and daily adaptive functioning (Sparrow et al., 1984). Roizen et al. found that such disparities were not significantly affected by the presence of either comorbid learning disabilities or other disruptive behavior disorders but did increase as a function of age. The authors speculated that this disparity may actually be useful as a marker of functional impairment in children with ADHD. Such a disparity probably reflects a discrepancy between knowing and doing, or ability and performance, given that measures of adaptive behavior assess the child's actual and typical performance in daily life situations rather than their factual knowledge or cognitive abilities.

To further evaluate this concept of IQ-adaptive disparity as a marker of impairment in ADHD, Stein et al. (1995) computed the degree of disparity between measured intelligence and adaptive functioning, as assessed by the Vineland Adaptive Behavior Scales (Sparrow et al., 1984), in three groups of clinic-referred children: those with ADHD, those with ADD (attention deficit disorder without hyperactivity), and those with PDD or MR. After controlling for degree of externalizing behaviors (symptoms of ODD/CD), the authors found that both the ADHD and ADD groups demonstrated significantly lower adaptive functioning relative to their intelligence than did the PDD/MR group in two of the three domains of adaptive functioning assessed by the Vineland, these being communication and daily living. No significant difference was found among the groups in their disparity between IQ and the socialization domain of

adaptive functioning, once ODD/CD symptoms were statistically covaried, implying that the presence of these symptoms may be necessary to create disparity in that specific domain of adaptive functioning. The general level of adaptive functioning in the PDD/MR group, like that of normal children, was observed to be relatively consistent with their level of intelligence. Yet this was not the case for the children with ADHD/ADD where significant adaptive disability, or disparity between IQ and adaptive functioning, was substantial.

Taking this concept of disability a step further, Greene and colleagues (Greene, et al., 1996) developed a psychometric formula for determining the presence of a significant IQ-functioning disparity which was borrowed from the literature on definitions of learning disabilities (Reynolds, 1984). However, instead of using an adaptive functioning measure, Greene et al. used one of social functioning (the Social Adjustment Inventory for Children and Adolescents; Orvaschel & Walsh, 1984). This measure of social functioning is not identical to that of adaptive functioning, concentrating as it does primarily on social skills and peer relations, though it may overlap somewhat with the socialization domain of measures like the Vineland. Based on the correlation of IQ with their social functioning measure, Greene et al. used intelligence scores to generate expected social functioning scores for children in their study. They then employed a *threshold of 1.65 or greater* on a standardized discrepancy score between observed and expected scores on the social functioning measure to define ADHD subjects as socially disabled. These socially disabled ADHD subjects had significantly higher rates of major depression, multiple anxiety disorders, and conduct disorder than did the nondisabled ADHD children. The two groups did not differ in rates of ADHD among family members but both differed substantially from control children in this respect. The disabled group also had higher ratings on most scales of the parent version of the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983) than did the ADHD children and control children while only the disabled group differed from control children in greater levels of impairment in family functioning. Using this same definition of social disability in a 4-year longitudinal study of ADHD children, Greene and colleagues (Greene, Biederman, Faraone, Sienna, & Garcia-Jetton, 1997) found that social disability was strongly predictive of higher rates of mood, anxiety, disruptive, and substance use disorders at outcome.

Given the success of Green et al. in using an IQ-social functioning discrepancy formula to identify social disability in ADHD children, the present study hypothesized that this formula may be usefully extrapolated to identifying children having adaptive disability as discussed by Roizen et al. (1994). In this case, a measure of adaptive functioning would be substituted into the Reynolds (1984) formula for that of social functioning so as to further evaluate the utility of the adaptive disability concept raised by Roizen et al. and later by Stein et al. (1995). The present study reports the results of an early screening project for detecting high-risk children with AHII behavior among public school children registering for kindergarten in a metropolitan school system. These preschool AHII children, most of whom were later diagnosed with ADHD, were selected to eventually participate in a multimethod intervention program for high risk children. Following identification as AHII, all received a thorough psychological and psychiatric evaluation and then progressed into the behavioral treatment study which would last their entire kindergarten academic year. The initial results of that study are to be reported elsewhere (Barkley et al., 1997). The present paper focuses upon the various forms of psychiatric, psychological, and educational morbidity found in association with the AHII behavior pattern in this preschool age group, an age group of children about which far less is currently known than is the case with school-age ADHD or AHII children (Mariani & Barkley, 1997). More importantly, the present study evaluated the utility of the adaptive disability concept by examining how the various morbidities found in the AHII children differed as a function of subgrouping into those who did and did not have significant adaptive disability.

METHOD

Subjects

The project took place from 1991 to 1996 as part of each spring's kindergarten registration process for

children entering Worcester, MA, public schools for the fall. The screening for high levels of hyperactivity and aggression was permitted by the school district only if it could be done within a brief period (10 min) during the already hectic registration process at the central registration office. Worcester is a city of nearly 170,000 residents having an annual enrollment of approximately 1,200 to 1,600 children per year for kindergarten.

At registration, parents were invited to complete a questionnaire about their child's AHII behavior patterns but were not required to do so to register their children. As a result, a sizable minority of parents (up to 20%) declined to complete the scale. No information is available to this project concerning the families who simply declined the offer to complete the screening questionnaire. Children who did not speak English or whose parents were not familiar with English sufficient to complete the screening questionnaire were excluded from the project. This eliminated some non-English speaking Hispanic and Asian families each year from the screening process. In the end, approximately 800 to 1,100 children per year over 3 years were ultimately screened for the presence of high levels of AHII behavior, for a total of approximately 3100 children screened by the project. Once identified as AHII on the screen, one of the principal investigators (R.A.B.) contacted parents by telephone to explain that their ratings had placed their children significantly above the normal range for these domains of behavior and that this might indicate a greater-than-normal risk for school behavioral adjustment problems in the upcoming kindergarten year. Families were further told of the nature of this early intervention project and that they would be randomly assigned to one of the four possible behavior treatment conditions (parent training only, special kindergarten enrichment classroom only, the combined treatment condition, and a no treatment condition). And so the study sample represented not only preschool children identified as significantly AHII but also those families willing to enter an early intervention study. Of those identified as AHII and presented with this invitation, 59% accepted it and joined this project, yielding a total of 170 AHII children. Subsequently, 12 AHII children either withdrew from the project or were deemed ineligible following their comprehensive summer evaluation.

A normal community control group was also chosen from this screening process by selecting every fifth name of children falling within 1 standard deviation of the mean on both the hyperactive/ADHD and aggressive/conduct problem items of the screening scale (see below). These families were invited to receive the same free annual psychological evaluations, described below, as did the AHII children over the 3 years of the project. Fifty-eight percent accepted the invitation to enter the project, resulting in 47 normal children for this group.

None of the children in either group were receiving psychotropic medication at the time of their initial evaluation. The gender representation was equivalent across both groups (control: 38% female, 62% male; AHII: 34% female, 66% male). The ethnic representation across groups was also not significantly different (AHII: 78% Caucasian, 10% African-American, 7% Puerto Rican, <1% Asian, 1% American Indian, and 3% other; control: 89% Caucasian, 4% African-American, 4% Puerto Rican, 2% Asian, and no American Indian). For comparative purposes, the ethnic representation in this city according to the 1990 census is 83.3% white, 4% African-American, 9.6% Hispanic, 2.8% Asian, and 0.3% Native American, suggesting that the study samples were a reasonable approximation to the ethnic representation in the Worcester population.

Significantly more custodial parents in the AHII group were currently separated or divorced from the other biological parent of the child than in the control group (40% vs. 19%), $x^2 = 7.2$, $p < .008$. The age of the children at the time of their parents' divorce was not significantly different between groups (2.2 years vs. 2.1 years). The percentage of mothers and fathers in each group working more than 20 hours per week in employment was not significantly different between these groups (mothers: 45% AHII vs. 53% control; fathers: 86% AHII vs. 92% control). However, more families of AHII children were receiving public

assistance than occurred in the control group (39% vs. 15%), $x^2 = 11.62$, $p < .003$.

Of the 158 AHII children deemed eligible to participate, four did not have adaptive functioning scores that would permit their subgrouping on this variable into adaptively disabled or nondisabled and so they were excluded from the analyses reported in this paper. The 154 remaining AHII children were subdivided into those who did and did not have adaptive disability. Adaptive functioning was assessed using the Normative Adaptive Behavior Checklist (NABC; Adams, 1984). This is a 120-item parent-completed survey of the child's adaptive functioning in eight areas of development, including fine motor and gross motor, language-communication, self-help skills, independence, home responsibilities, etc. The total adaptive behavior score (standard score) was used here for subgrouping. We identified children as adaptively disabled following the same formula recommended by Reynolds (1984) for learning disabilities and adopted by Greene et al. (1996) in defining social disability, this being a significant discrepancy between expected and actual adaptive functioning standard scores. The child's Broad Cognitive Index (full-scale IQ score) from the Woodcock-Johnson Psychoeducational Assessment Battery (Woodcock & Johnson, 1984) (see below) was used to create expected adaptive functioning scores as follows: (1) IQ and NABC standard scores were converted to *Z*-scores (Z_{IQ}, and Z_A); (2) the expected NABC score (Z_{EA}) was then estimated using the following equation: $Z_{EA} = r_{IQA} \times Z_{IQ}$, where r_{IQA} is the correlation between IQ and NABC scores within the control group ($r = .148$, p = not significant); (3) the discrepancy score was then calculated as $Z_{EA} - Z_A$ and its standard deviation was $.\sqrt{1 - r^2_{IQA}}$; (4) the standardized discrepancy score was then computed as: $(Z_{EA} - Z_A) + \sqrt{1 - r^2_{IQA}}$; and (5) any child with a standardized discrepancy score of 1.25 or greater was classified as being adaptively disabled. This resulted in 38 AHII children (25%) being classified as AHII with adaptive disability (AHII + AD), leaving 116 AHII children as not disabled (AHII — AD), and 47 control children. These three groups were used for all subsequent statistical analyses. We chose a more liberal threshold for discrepancy of 1.25 rather than the 1.65 (95th percentile) used by Greene et al. because our sample was a community derived sample likely to be less impaired than were the clinic-referred subjects used in their study. Even so, our threshold represents approximately the 90th percentile (89.4) for such standardized discrepancy scores and resulted in a substantial separation of the adaptively disabled AHII group from the nondisabled AHII and control groups on the NABC (see below).

Procedures

A parent-completed rating scale was constructed for the identification of youngsters having significant elevations in the AHII behavior pattern for use at kindergarten registration. The screening scale contained the 14 symptom items for ADHD and eight symptom items for ODD from the Diagnostic and Statistical Manual of Mental Disorders (3rd ed., rev.) (DSM-III-R; American Psychiatric Association, 1987) as well as the nonredundant hyperactive-impulsive factor items and conduct problem factor items from the Conners Parent Rating Scale-Revised (CPRS-R; Goyette, Conners, & Ulrich, 1978). To be identified as hyperactive-aggressive, parents had to rate their children as placing above the 93rd percentile on either the ADHD or CPRS-R hyperactive-impulsive items and above the 93rd percentile for the ODD or CPRS-R conduct problem items. Consequently, scores on both the hyperactive-impulsive-inattentive dimension and the aggression dimension had to place the child approximately in the top 7% of normal children. During the first year of screening, norms published for these items were employed (see DuPaul, 1991, for ADHD items; Goyette et al., 1978, for Conners scale items). During the second and third years of screening, the actual local norms derived from the more than 1,000 children screened in Year 1 were employed instead. The adjustments made in Years 2 and 3 to the cutoff points as a consequence based on these local norms were slightly lower than the cutoffs based on published norms. Thus subjects in the cohort from Year 1 were as deviant or more deviant as those in the cohorts from Years 2 and 3.

Over the summer months following registration, the AHII and normal children received a lengthy evaluation. This battery consisted of structured psychiatric interviews, psychological and academic tests, parent behavior rating scales, and direct behavioral observations of the children in the clinic. These tests

and observations were conducted in the same order for all children. All of the AHII children were randomly assigned to four treatment groups for their fall kindergarten program. These included no treatment, parent training only, special treatment classroom only, and combined parent training and special classroom. As noted earlier, the results for these interventions are to be reported elsewhere. Between the middle and end of September all children were observed in their kindergarten classrooms and teachers completed behavior rating scales about these children.

The research assistants conducting the summer evaluations were blind to group membership. However, for the September classroom observations, these assistants were aware that the children they were observing in the special treatment classrooms that were about to begin were from the AHII group. The assistants remained blinded, however, to the group membership of the AHII and normal children they were observing who were in the regular kindergarten classes. Likewise, the teachers who completed the teacher ratings on the children in these two special treatment classrooms were aware that these children were members of the AHII group. Teachers of the AHII and normal children who were in regular kindergarten classes, however, were unaware of the group membership of these children. It should be noted that the treatment program slated for the special kindergarten classrooms did not begin until early October, and so these teacher ratings and class observations were collected during a pretreatment phase in this project. The research assistants were also blind to the subgrouping of the AHII children as adaptively disabled or not.

Dependent Measures

Clinical Diagnostic Interview. The printed version of the DISC-P (Diagnostic Interview Schedule for Children-Parent Form) version 2.1 that was constructed and used in the DSM-IV (APA, 1994) field trials (Lahey et al., 1994) was employed in this study. This particular interview was designed to collect information on both DSM-III-R and DSM-IV symptom lists for 12 childhood disorders. Interviewers held master's degrees in psychology and had received training in the use of this interview as part of the DSM-IV field trials or were trained and supervised by the principal investigators who participated in those trials (T S. and R. A. B.). The final decision as to the presence or absence of a symptom and the age of onset of symptoms or impairments, where necessary, were made by these trained interviewers. The final diagnosis was not made by this interviewer, however, but by the application of the subsequently developed DSM-IV diagnostic algorithms as applied to these data as they existed in the data base. No intercoder reliability information was collected on these interviews; however, test-retest reliability was collected on a subset of subjects and provided to the DSM-IV field trial project (Lahey et al., 1994). Since the final DSM-IV symptom lists for each disorder are now published, this study employed these more recent diagnostic algorithms in the conversion of the results of this interview into diagnoses rather than using the older DSM-III-R criteria.

Parent Ratings of Child Behavior. These included the following:

1. *Child Behavior Checklist (Achenbach & Edelbrock, 1983).* This scale provides T-scores for eight different dimensions of child psychopathology and has been used extensively in child mental health research. The revised 1991 scoring system was employed in this study.
2. *Conners Parent Rating Scale-Revised (Goyette et al., 1978).* This is a 48-item rating scale commonly employed in research on hyperactive children (see Barkley, 1990). It yields a total raw score as well as separate scores for behavioral problems involving conduct, learning, attention, psychosomatic symptoms, hyperactive-impulsive behavior, and anxiety. Only the total raw score was used here.
3. *Home Situations Questionnaire (HSQ; Barkley, 1990).* This scale assesses the pervasiveness of behavior problems across 16 different home and public settings (Number of Problem Settings Score) and the severity of these behavior problems (Mean Severity score) on a Likert scale of 1 to 9.

Parent Self-Report Ratings of Psychological Adjustment. These included the following:

1. *Symptom Checklist 90—Revised (SCL-90-R) (Derogatis, 1986).* This scale is completed by the parents (chiefly mothers) and yields T-scores for eight different dimensions of adult psychopathology, including anxiety, depression, phobic, hostility, interpersonal sensitivity, somatic complaints, psychosis, etc.
2. *Locke-Wallace Marital Adjustment Test (LWMAT• Locke & Wallace, 1959).* This is a brief adult self-report questionnaire that surveys the parent's satisfaction with the current marriage, if married. A single raw summary score was employed.
3. *Parenting Stress Index—Short Form (PSI; Abidin, 1986).* This scale completed by parents evaluates the degree of perceived stress in the role of being a parent to this particular child. Only the Total Stress raw score was used here.
4. *Parenting Sense of Competence Scale (Gibaud-Wallston & Wandersman, 1978; Mash & Johnston, 1983).* This self-report scale evaluates a parent's degree of self-perceived competence or efficacy (9 items) and satisfaction (7 items) in their role as a parent. It produces separate raw scores for each of these two domains.
5. *Parenting Practices Scale (Strayhom & Weidman, 1988).* This is a 34 item scale used to assess the extent to which parents use practices commonly taught in most behavioral parent training programs. A single raw summary score was used.

Teacher Rating Scales of Child Behavior. These included the following:

1. *Child Behavior Checklist—Teacher Report Form (CBCL-TRF; Achenbach & Edelbrock, 1986).* This scale contains 126 items related to children's behavioral and emotional problems. It yields T-scores for seven scales identical to those for the parent version noted above, with the exception that no Sex Problems scale is generated. Again, the 1991 scoring system was employed for this study.
2. *Conners Teacher Rating Scale Revised (Goyette et al., 1978).* This scale contains 28 items evaluating children's behavioral problems in the domains of conduct, inattention, and hyperactive-impulsive behavior. Only the total raw score was employed.
3. *School Situations Questionnaire (SSQ; Barkley, 1990).* This rating scale provides a measure of the pervasiveness of a child's behavior problems across 12 different school situations (Number of Problem Settings score). Each problem setting was rated as to severity using a 9-point Likert scale from which a Mean Severity score across all problem settings was calculated. These two raw scores were used here.
4. *Self-Control Rating Scale (SCRS; Kendall & Wilcox, 1979).* This is a 33-item scale that assesses children's self-control; a single raw score was used here.
5. *Social Skills Rating Scale (SSRS; Gresham & Elliott, 1990).* This standardized and normed teacher completed scale assesses the a child's social skills (30 items), behavioral problems (18 items), and academic competence (nine items). Three standard scores were obtained, one for each domain.

Psychological Testing. These included the following:

1. *Woodcock Johnson Psychoeducational Test Baum (Woodcock & Johnson, 1984).* This battery includes tests assessing cognitive abilities (intelligence), academic knowledge (science, social studies, humanities), and academic skills (reading, math, spelling). Standard scores for each subtest and for General Cognitive Ability were employed here.
2. *Continuous Performance Test (CPT; Gordon, 1983).* The preschool version was used here. The device provided raw scores for total correct and number of commission errors. The task presents single digits on the screen of a computerized device at the rate of one per second with the target digit (1) appearing in a random series of digits. The task lasts 6 min. Due to the young age of the subjects and consistent with recommendations of the test developer, the examiner remained in the room during the testing.

Clinic Behavioral Observations. These included the following:

1. *Disruptive behavior during the CPT*. During the child's performance of the CPT, the child's behavior was videotaped from behind a one-way mirror. These videotapes were later coded for four categories of behavior related to ADHD using the Restricted Academic Situations Coding System developed by Barkley (1990). These categories were: off-task, fidgets, vocalizes, and out-of-seat. Definitions of the codes and information on the reliability and validity of the system can be found elsewhere (Barkley, 1990; Barkley, DuPaul, & McMurray, 1990). The examiner recorded the occurrence of each behavior category within each 15-s interval. The measures were obtained by calculating the percent occurrence of each category relative to the total possible occurrences. A second coder independently recoded 20% of the videotapes so as to provide an estimate of intercoder reliability. Agreement between these two coders was computed using Pearson correlations for the scores of percent occurrence for each category. The intercoder agreements (*rs*) were Off-task = .97, fidgets = .93, vocalizes = .95, and out-of-seat = .97.
2. *Disruptive behavior during a chip-sort task (Mariani & Barkley, 1997).* This task was designed to be comparable to the Restricted Academic Situations task previously used with school-age ADHD children (Barkley, 1990; Barkley, Fischer, Newby, & Breen, 1988): Typically, this procedure involves placing the child in a clinic playroom with adjacent observation room and shared one-way mirror. The child sits alone and performs math problems. Here this procedure was modified such that the child was required to sort plastic colored chips into containers by their color (red, blue, white) instead of performing math problems. The task lasted 15 min. The child was videotaped from behind the one-way mirror during this task. An observer coded this tape and used the same four behavior categories used during the CPT above. A second coder independently recoded 20% of the videotapes so as to provide an estimate of intercoder reliability. Using Pearson correlations, the results were off-Task = .94, fidgets = .95, vocalizes = .98, and out-of-seat = .98.
3. *Mother-child interactions during free play and task periods*. Mothers and children were asked to play with each other using toys in a playroom for a 10-min period (free play). The mother was then given a list of commands to have her child perform (i.e., pick up toys, dust a table, pick up trash scattered about the floor, pick up clothes scattered about the floor and put them into a box, draw a line together through a maze on an Etch-A-Sketch toy, and have child copy simple geometric design) while a television played a videotape of a popular cartoon show (*Scoobie Doo*) in the background (task period). These periods were videotaped from behind a one-way mirror. Observers later reviewed the tapes and then rated the mother and child on a rating form of various negative behaviors. Of these items, 14 dealt with maternal behavior (i.e., directive, commanding, punitive behavior, etc.) and 15 with child behavior (i.e., defiance, conflict, negativity, uncooperativeness, etc.). Each item was rated on a 7-point Likert scale. Separate scores were determined for the children and their mothers for each period (free play, task). A second coder reviewed 20% of these videotapes and rated the mothers' and children's behavior so as to determine intercoder reliabilities. Agreement was computed using Pearson correlations for the total raw scores. The results for free play were mother's behavior = .59, and child's behavior = .54. For the task setting, they were mother's behavior = .67, and child's behavior = .79. The moderate reliabilities for free play encourage caution in the interpretation of these ratings.

Examiner Ratings of Subject's Behavior Throughout Testing. A rating scale was created comprising 17 items of various behavioral problems. The items dealt with anxiety, shyness, and withdrawal as well as symptoms of ADHD and ODD. Each item was rated on a 7-point scale by the Research Technician based upon the subject's behavior throughout the entire session they spent testing the child. The total raw score served as the measure. Higher total scores reflected more deviant behavior.

Classroom Behavioral Observations. To record behavior in the classrooms, this study employed the Child

Behavior Checklist—Direct Observation Form (Achenbach, 1986). This coding system assesses the same behavioral items that are found on the parent and teacher versions of the CBCL described above. The coder observed the child for 1 hour, after which the rating scale was completed. The total raw scores for the externalizing and internalizing items were scored separately and reported here. For 20% of the subjects, a second observer accompanied the first to the same classroom and observed the child for the same 1-hour interval after which this coder also completed an observation form. The two coders in this case did not sit adjacent to each other nor did they observe the other's completion of this observation form. Intercoder reliability was calculated using Pearson correlations separately for the Externalizing and Internalizing scales with the following results: Internalizing symptoms = .69, Externalizing symptoms = 0.80.

RESULTS

Demographic Information

The demographic information obtained on these parents and children is shown in Table I. The three groups were compared on the dependent measures using F-tests. The level of significance chosen for these particular statistical tests was set at $p < .05$ so as to allow for a determination of how well equated the groups were on these demographic and child variables. Where these analyses were significant, pairwise comparisons were conducted. The AHII group having adaptive disability (AHII + AD) was significantly older than the other two groups in age of the children. Both AHII groups had significantly lower Peabody Picture Vocabulary Test-Revised (PPVT-R) simple verbal IQ scores than the control group but did not differ from each other. Mothers of both AHII groups were significantly younger and less educated than mothers of the control children but again these AHII groups did not differ from each other in these respects. Only the fathers of the AHII + AD group were less educated than the control group. The AHII - AD group did not differ from the other two groups in father education. The groups did not differ in the age of their fathers nor in the mothers' and fathers' socioeconomic status as determined by the Hollingshead Two Factor Index of Social Position (Hollingshead, 1975).

Child Psychiatric Disorders

The parents (largely mothers) were interviewed using the DISC-P for DSM-III-R and DSM-IV disorders. Given that symptoms of ADHD and ODD were used to screen and select the subjects, it is not surprising that more of both AHII groups received a DSM-IV diagnosis of ADHD (disabled = 78.9%; nondisabled = 61.9%) and of ODD (disabled = 76.3%; nondisabled = 60.3%) than was found in the control group (0% for both diagnoses). The AHII groups did not differ significantly from each other in this respect. However, significantly more AHII + AD children received a diagnosis of CD (30.6%) than did the other nondisabled AHII group (14.3%), $x^2 = 4.84$, $df = 1$, $p < .05$. Both groups showed more CD than the control group (0%). There were no significant group differences for rates of any other psychiatric disorders.

Parent Ratings of Child Behavior

The results for all dependent measures are shown in Table II. Given the large number of dependent measures listed in this table, the level of significance chosen for these statistical tests was set at p .01 to reduce the likelihood of Type I errors. And because of the group differences noted earlier in child age and PPVT-R vocabulary standard scores, these measures served as covariates in all subsequent statistical analyses involving the dependent measures. Parents of both groups of AHII children rated the children as having significantly more problems on all eight scales of the CBCL as well as on the CPRS-R and the Number of Problem Settings and Mean Severity scores of the HSQ than did parents of the children in the control group. On six of these measures, however, children in the AHII + AD group were rated significantly worse (higher) than the AHII —AD group as well. These included the CBCL scales of Aggression, Attention, and Thought Problems as well as the CPRS-R Total score and both scores on the HSQ.

Table I. Initial Demographic Characteristics and Child Adaptive Functioning[a]

Measure	(1) AHII Disabled	(2) AHII Nondisabled	(3) Community Control	*F*	*p* <	Contrasts
Child's Age (years)						
M	5.1	4.7	4.8	10.29	.001	1>2,1>3
(*SD*)	(0.5)	(0.5)	(0.4)			
Child's PPVT-R IQ						
M	91.8	91.9	99.1	3.86	.03	1<3, 2<3
(*SD*)	(17.2)	(15.2)	(14.8)			
NABC						
M	75.0	93.2	97.4	67.59	.001	1<2<3
(*SD*)	(4.9)	(9.1)	(12.7)			
Mother age (years)						
M	29.4	29.4	32.6	7.54	.001	1<3, 2<3
(*SD*)	(5.2)	(4.8)	(5.4)			
Father age (years)						
M	33.9	32.9	34.9	1.60	—	
(*SD*)	(9.7)	(5.4)	(6.4)			
Mother education (years)						
M	12.5	12.7	13.7	4.67	.01	1<3, 2<3
(*SD*)	(2.4)	(2.1)	(2.4)			
Father education (years)						
M	12.2	12.7	13.8	3.87	.03	1<3
(*SD*)	(2.4)	(2.5)	(3.0)			
Mother SES						
M	27.7	30.7	36.1	1.07	—	
(*SD*)	(22.1)	(24.6)	(26.1)			
Father SES						
M	42.3	44.2	49.0	0.78	0.78	
(*SD*)	(23.7)	(23.6)	(23.1)			

[a]AHII = aggressive-hyperactive-impulsive group; *SD* = standard deviation; *F* = results for the F-test; p = probability value for the *F*-test if significant; Contrasts = results of *post hoc* Tukey HSD pairwise comparisons; PPVT-R = Peabody Picture Vocabulary Test—Revised; NABC = Normative Adaptive Behavior Checklist; SES = Socioeconomic status based on the Hollingshead Two Factor Index of Social Position.

Parent Self-Reports Measures

Mothers completed several rating scales about their role as parents and about their own psychological adjustment. Given the group differences found earlier for maternal age and education, these measures served as covariates in these analyses of the maternal self-report measures of parental functioning. Results for these scales also appear in Table II. Parents of children in both AHII groups rated themselves as significantly less satisfied and efficacious in their role as parents to their children than parents of the control children. They also reported experiencing significantly more stress in their parental role than parents of control children. In terms of their use of effective child management practices (Parenting Practices Scale), parents of both groups of AHII children rated themselves as employing such methods significantly less than parents of control children. In addition parents of both AHII groups indicated that they were significantly less satisfied with their marriages than parents of control children. The two AHII groups differed among themselves only on the Parenting Practices Scale, where the AHII + AD parents rated themselves as using significantly fewer positive practices than the parents of the other two subject groups.

As Table II shows, parents of both AHII groups reported significantly more symptoms of psychological problems on all subscales of the SCL-90-R except for the Phobic subscale than did parents of control children. The two AHII groups differed only on the Paranoid subscale, where parents of AHII + AD children reported significantly higher scores than either of the other subject groups.

Teacher Ratings and Direct Classroom Observations

The results for the teacher rating scales and class observations are displayed in Table II as well. Teachers rated both of the AHII groups as having significantly more problems on the CTRS-R, as having behavior problems in more school settings and to a more severe degree (SSQ), as having less self-control (Self-Control Rating Scale), as being less socially skilled and academically competent, and as having more behavioral problems on the SSRS than the control children. On the CBCL-TRF, teachers rated both groups of AHII children significantly higher on the scales of Aggression, Anxious/Depressed, Inattention, Social Problems, and Delinquent than the control group. The groups did not differ on the Somatic or Thought Problems scales of the TRF. The children in the AHII + AD group differed from the AHII - AD group in receiving significantly worse mean severity scores on the SSQ, on the Self-Control rating scale, on the SSRS Academic Competence scale, and on the CBCL-TRF Attention Problems and Social Problems scales.

Concerning the results of the CBCL-DOF, both AHII groups had significantly more externalizing symptoms than the control children, but the two AHII groups did not differ from each other. There were no significant differences among the groups on the Internalizing Symptoms scale.

Psychological Test Results

These results appear in Table II. There were no significant group differences on the cognitive subtests of this battery after controlling for age and PPVT-R IQ scores. For the academic achievement portion of this battery, both groups of AHII children were significantly behind the control children in Applied Problems (math), and Dictation (spelling) and so consequently received significantly lower scores on the overall Academic Skills summary score. But neither AHII group differed from normal in their overall Academic Knowledge nor on the specific knowledge tests of Science, Social Studies, or Humanities. The AHII + AD group performed significantly worse than the AHII - AD group only on the Applied Problems (math) scale. On none of the other measures from this battery were the two AHII groups significantly different from each other.

On the CPT, there were no significant group differences on either the number of commission errors or on the number of correct responses.

Behavioral Observations in the Clinic

The results for the various observations of the children taken during their clinical evaluation revealed few significant group differences. No group differences were evident on the observations of behaviors related to ADHD (i.e., off-task, fidgets, etc.) taken either during the performance of the CPT or the chip sort task. The results for the observations of the mother-child interactions taken during a free play and work period also indicated no significant group differences for either the child's or mother's behavior. On the examiner's ratings of the children's behavior during the psychological testing, both AHII groups were rated as having significantly more behavioral problems during the testing than the control children, but the two AHII groups did not differ from each other in this respect ($F = 4.66$, $df = 2/193$, $p. < 01$).

Table II. Profile of Adaptively Disabled AHII Preschool Children in Comparison to Nondisabled AHII and Normal Community Control Children[a]

Measure	(1) AHII Disabled	(2) AHII Nondisabled	(3) Community Control	*F*	*p* <	Contrasts
			Parent ratings			
CBCL Aggressive						
M	70.5	66.2	51.6	56.15	.001	1>2>3
(*SD*)	(11.6)	(9.8)	(3.8)			
CBCL Delinquent						
M	63.9	62.0	51.8	34.43	.001	1>3, 2>3
(*SD*)	(8.3)	(8.3)	(3.2)			
CBCL Attention						
M	65.3	59.6	50.7	46.00	.001	1>2>3
(*SD*)	(8.7)	(7.6)	(2.0)			
CBCL Anxious Depressed						
M	58.2	56.7	51.5	15.55	.001	1>3, 2>3
(*SD*)	(7.7)	(6.3)	(3.7)			
CBCL Sex Problems						
M	56.8	57.3	52.2	5.21	.003	1>3, 2>3
(*SD*)	(9.9)	(9.4)	(5.3)			
CBCL Somatic						
M	56.6	55.5	51.9	7.70	.001	1>3, 2>3
(*SD*)	(7.2)	(6.3)	(4.0)			
CBCL Thought						
M	64.8	57.7	51.6	39.91	.001	1>2>3
(*SD*)	(8.2)	(7.4)	(3.0)			
CBCL Withdrawn						
M	58.8	55.9	52.4	10.01	.001	1>3, 2>3
(*SD*)	(7.9)	(6.6)	(4.3)			
CPRS-R Total						
M	52.8	41.4	11.8	73.36	.001	1>2>3
(*SD*)	(21.4)	(16.9)	(9.1)			
HSQ—Settings						
M	10.0	8.6	3.5	61.34	.001	1>2>3
(*SD*)	(3.3)	(3.0)	(2.5)			
HSQ—Severity						
M	4.9	4.1	2.0	42.51	.001	1>2>3
(*SD*)	(1.5)	(1.5)	(1.3)			
			Parent self-reports			
Satisfaction						
M	32.2	34.9	42.7	29.02	.001	1<3, 2<3
(*SD*)	(7.9)	(7.0)	(6.1)			
Efficacy						
M	26.4	28.0	31.9	12.86	.001	1<3, 2<3
(*SD*)	(6.1)	(5.1)	(4.9)			
Parenting Stress						
M	81.9	76.9	27.9	75.81	.001	1>3, 2>3
(*SD*)	(22.4)	(21.7)	(28.3)			
Parent Practices						
M	128.5	135.0	148.1	25.30	.001	1<2<3
(*SD*)	(7.9)	(7.0)	(6.1)			
Marital Satis.						
M	92.1	100.4	114.8	6.50	.002	1<3, 2<3
(*SD*)	(31.1)	(28.0)	(22.4)			

Table II. Continued

Measure	(1) AHII Disabled	(2) AHII Nondisabled	(3) Community Control	*F*	*p* <	Contrasts
			SCL-90-R			
Somatization						
M	52.0	50.7	45.0	7.40	.001	1>3, 2>3
(*SD*)	(9.9)	(9.8)	(9.1)			
Obsess.-Comp.						
M	56.3	54.3	45.4	16.46	.001	1>3, 2>3
(*SD*)	(9.7)	(10.6)	(8.6)			
Depression						
M	57.9	54.1	44.6	18.49	.001	1>3, 2>3
(*SD*)	(10.9)	(11.5)	(9.5)			
Anxiety						
M	51.2	49.3	43.6	6.70	.002	1>3, 2>3
(*SD*)	(11.4)	(10.7)	(8.8)			
Hostility						
M	58.1	56.4	45.8	23.49	.001	1>3, 2>3
(*SD*)	(10.8)	(10.2)	(7.2)			
Phobic						
M	49.9	48.6	46.7	1.96	—	
(*SD*)	(8.9)	(7.7)	(6.0)			
Paranoid						
M	57.2	52.5	46.2	12.10	.001	1>2>3
(*SD*)	(10.3)	(11.1)	(8.2)			
Psychotic						
M	55.0	53.7	48.5	5.86	.003	1>3, 2>3
(*SD*)	(7.9)	(7.0)	(6.1)			
			Teacher ratings			
CTRS-R						
M	31.7	22.7	9.1	15.40	.001	1>2>3
(*SD*)	(20.3)	(19.1)	(13.2)			
SSQ—Settings						
M	5.5	4.6	1.5	14.59	.001	1>3, 2>3
(*SD*)	(3.3)	(3.8)	(2.4)			
SSQ—Severity						
M	3.6	2.5	1.2	15.38	.001	1>2>3
(*SD*)	(2.1)	(1.9)	(1.6)			
Self-Control						
M	41.2	46.6	57.6	16.53	.001	1<2<3
(*SD*)	(14.3)	(12.7)	(10.8)			
SSRS Social Skills						
M	90.5	92.7	103.2	9.37	.001	1<3, 2<3
(*SD*)	(14.6)	(13.8)	(12.3)			
SSRS Behavior						
M	112.5	107.8	95.1	15.15	.001	1>3, 2>3
(*SD*)	(15.6)	(14.8)	(13.1)			
SSRS Academic						
M	90.7	92.6	100.6	10.71	.001	1<2<3
(*SD*)	(11.4)	(11.5)	(10.3)			
CBCL Aggressive						
M	63.2	59.7	52.9	11.89	.001	1>3, 2>3
(*SD*)	(11.6)	(9.9)	(5.1)			

Table II. Continued

Measure	(1) AHII Disabled	(2) AHII Nondisabled	(3) Community Control	*F*	*p* <	Contrasts
CBCL Anxious						
M	57.3	54.8	50.8	12.12	.001	1>3, 2>3
(*SD*)	(7.6)	(6.2)	(1.5)			
CBCL Attention						
M	60.9	56.8	52.2	14.88	.001	1>2>3
(*SD*)	(7.8)	(8.1)	(5.4)			
CBCL Delinquent						
M	57.8	56.2	51.9	8.80	.001	1>3, 2>3
(*SD*)	(7.5)	(7.2)	(4.2)			
CBCL Social						
M	59.3	55.4	52.7	10.07	.001	1>2>3
(*SD*)	(6.2)	(7.0)	(4.4)			
CBCL Somatic						
M	51.8	50.9	51.6	1.98	—	
(*SD*)	(3.6)	(3.0)	(4.3)			
CBCL Thought						
M	53.0	52.4	51.3	0.84	—	
(*SD*)	(6.6)	(6.0)	(4.5)			
CBCL Withdrawn						
M	56.4	55.0	52.2	4.32	—	
(*SD*)	(7.9)	(6.8)	(4.0)			
CBCL—Direct Classroom Observation Form (raw scores)						
Internalizing						
M	12.3	10.5	8.1	3.30	—	
(*SD*)	(6.7)	(6.4)	(5.2)			
Externalizing						
M	12.7	11.4	5.7	6.77	.001	1>3, 2>3
(*SD*)	(9.9)	(10.4)	(6.2)			
Woodcock-Johnson cognitive tests (standard scores)						
Memory for Names						
M	98.8	94.0	99.3	1.14	—	
(*SD*)	(13.1)	(14.5)	(11.5)			
Memory for Sentences						
M	95.6	96.2	100.2	0.34	—	
(*SD*)	(13.4)	(13.3)	(13.3)			
Incomplete Words						
M	95.1	96.0	100.6	2.34	—	
(*SD*)	(9.1)	(8.9)	(10.2)			
Visual Closure						
M	96.0	100.6	105.7	2.86	—	
(*SD*)	(14.7)	(14.3)	(12.9)			
Picture Vocabulary						
M	106.0	103.0	106.0	0.73	—	
(*SD*)	(16.6)	(14.0)	(15.3)			
Broad Cog. Index						
M	97.3	97.3	103.9	1.05	—	
(*SD*)	(12.7)	(12.7)	(13.0)			
Woodcock Johnson achievement tests (standard scores)						
Letter/Word Ident.						
M	88.9	91.8	97.5	2.87	—	
(*SD*)	(10.1)	(11.6)	(10.2)			

Table II. Continued

Measure	(1) AHII Disabled	(2) AHII Nondisabled	(3) Community Control	*F*	*p* <	Contrasts
Applied Problems						
M	93.7	99.3	107.9	7.28	.001	1<2<3
(*SD*)	(16.5)	(13.4)	(12.5)			
Dictation (Spelling)						
M	86.4	91.9	99.8	6.03	.003	1<3, 2<3
(*SD*)	(12.4)	(14.6)	(15.6)			
Science						
M	108.4	106.3	110.8	0.34	—	
(*SD*)	(17.4)	(16.7)	(16.7)			
Social Studies						
M	106.8	106.3	109.7	0.24	—	
(*SD*)	(16.5)	(16.9)	(14.7)			
Humanities						
M	100.8	102.0	105.5	0.34	—	
(*SD*)	(12.1)	(12.7)	(10.3)			
Broad Knowledge						
M	104.7	104.7	108.7	0.09	—	
(*SD*)	(15.1)	(14.6)	(12.3)			
Academic Skills						
M	85.7	91.2	99.7	6.98	.001	1<3, 2<3
(*SD*)	(12.3)	(14.1)	(14.0)			
Continuous Performance Test (raw scores)						
Commission Errors						
M	24.5	27.3	14.8	3.91	—	
(*SD*)	(21.6)	(24.1)	(17.4)			
Total Correct						
M	18.4	18.6	20.9	2.15	—	
(*SD*)	(7.4)	(6.6)	(6.9)			

[a]AHII = aggressive-hyperactive-impulsive-inattentive; *SD* = standard deviation; *F* = results for the one-way analysis of covariance; *p* = probability value for the F-test if significant; CBCL = Child Behavior Checklist; CPRS-R = Conners Parent Rating Scale—Revised; HSQ = Home Situations Questionnaire; Satis. = Satisfaction (from the Locke-Wallace Marital Satisfaction Test); SCL-90-R = Symptom Checklist 90—Revised; Obsess.-Comp. = Obsessive-Compulsive; CTRS-R = Conners Teacher Rating Scale—Revised; SSQ = School Situations Questionnaire; SSRS = Social Skills Rating Scale; Cog. = Cognitive; Ident. = Identification.

DISCUSSION

In general, the present study replicates the findings of previous studies screening preschool children for the presence of high levels of AHII or disruptive behavior patterns (August, Realmuto, Crosby, & MacDonald, 1995; McGee et al., 1991; StormontSpurgin & Zentall, 1995). The AHII children in this study had a high probability of having one or more child psychiatric disorders and were at elevated risk for numerous behavioral, emotional, cognitive, academic, and social problems as revealed by a subsequent extensive multimethod, multisource assessment battery. Behavior ratings by teachers, direct observations taken in the children's classes, academic achievement testing, and observations of test-taking behavior in a clinical setting all identified areas of significant maladjustment in AHII children relative to normal community control children in the present study. Moreover, this study found that the parents of such children also have a higher likelihood of psychological problems than do parents of control children. These findings clearly underscore the high risk nature of both the AHII children and their parents and continue to encourage efforts at early intervention and prevention with this population.

Not surprisingly, this study documented that 62% to 79% percent of children with high levels of AHII behavior were found to subsequently meet DSM-IV clinical diagnostic criteria for ADHD. Between 60% and 76% also qualified for a clinical diagnosis of oppositional defiant disorder. Such elevated rates would have been expected given that the DSM-III-R version of the symptom lists for these disorders were

employed as part of the screening scale completed by parents at kindergarten registration. Nor was the significantly greater occurrence of conduct disorder (CD) in the AHII sample unexpected given that both ADHD and ODD have been shown previously to convey a higher risk for CD (Barkley, Fischer, et al., 1990; Hinshaw, 1987; Loeber, 1990). Between 14% and 30% of the AHII children met criteria for conduct disorder as preschoolers, foreboding a much greater risk for later delinquency, substance abuse, and academic failure in this subsample of AHII children as documented in a number of longitudinal studies (Biederman et al., 1996; Coie, Lochman, Terry, & Hyman, 1992; Farrington, Loeber, & van Kammen, 1990; Loeber, 1990; Mannuzza et al., 1993).

The present research also documented an increased occurrence of internalizing symptoms in AHII children as reflected in parent and teacher ratings on the CBCL. Such results are in keeping with studies of both clinic-referred and community-based samples of children having hyperactivity or ADHD that have found greater degrees of internalizing symptoms beyond just the greater risk for externalizing or disruptive behavior disorders often found in these children (Biederman, et al., 1992; Eiraldi, Power, & Nezu, 1997; Gaub & Carlson, 1997). The overlap of anxiety disorders with ADHD has been found to be up to 25% to 40% in clinic-referred children (Biederman et al., 1992) yet the disorders appear to be independently transmitted within families (Biederman, Faraone, Keenan, Knee, & Tsuang, 1990). Although this study found higher symptom ratings for anxiety and depression in AHII children, it did not find higher rates of either psychiatric disorder in this group. This may largely be due to our use of a community screening to obtain our sample whereas prior studies have focused mostly on clinic-referred children who would be expected to have more severe and multiple forms of psychiatric disturbance.

Past research on preschool children with hyperactivity or ADHD has typically found them to have significant deficits in general cognitive ability (intelligence or IQ) and in specific academic skills, both in the preschool years (Campbell, Szumowski, Ewing, & Breaux, 1982; Cohen & Minde, 1983; Mariani & Barkley, 1997; Schleifer et al., 1975) and later in development (Fischer et al., 1990; McGee et al., 1991). Aggressive behavior or conduct problems have also been shown to be associated with low intelligence and delays in academic skills (Loeber, 1990; Loeber & Hay, 1997; Patterson et al., 1992). Studies using both normal samples (Hinshaw, Morrison, Carte, & Corn-sweet, 1987; McGee, Williams, & Silva, 1985) and behavior problem samples (Sonuga-Barke, Lamparelli, Stevenson, Thompson, & Henry, 1994) have likewise found significant negative associations between degree of rated hyperactive-impulsive behavior and intelligence. The present study is consistent with this body of literature in demonstrating significantly lower IQ scores in AHII children. Past research has shown that the association between ratings of conduct problems and intelligence in children are often much smaller or even nonsignificant, particularly when hyperactive-impulsive behavior is partialled out of the relationship (Hinshaw et al., 1987; Lynam, Moffitt, & Stouthamer-Loeber, 1993; Sonuga-Barke et al., 1994). This implies that the relationship between IQ and disruptive behavior in children is relatively specific to the hyperactive-impulsive-inattentive dimension of the disruptive behavior disorders than to aggression, oppositional, or conduct problems (see Hinshaw, 1987, 1992, for reviews).

The AHII children in the present study were selected chiefly on the basis of significantly elevated scores on a brief parent rating scale evaluating AHII behavior in their children. It should not be surprising then to find that such children scored significantly higher on other parent completed measures of child behavior and adjustment in the present study given the common source of information across these measures. But the AHII children were also found to demonstrate significantly more behavioral problems as assessed through teacher ratings of classroom behavior when the children entered kindergarten as well as on direct behavioral observations of the children taken in those classrooms by independent observers. Moreover, examiner ratings of the children's behavior taken in the clinic evaluation as well as observations of mother-child interactions during play and task performances further documented these greater behavioral difficulties in the AHII children relative to the control children. Such findings provide some validation for

the parents' reports of their children's problems. The results also underscore the utility of using brief parent ratings for the identification of children at high risk for both concurrent and later psychological, social, and educational problems, as have also been found by others (McGee et al., 1991).

The present study found that parents of AHII children had significantly more psychological problems, less marital satisfaction, and greater stress, less satisfaction, and less efficacy in their parental roles. This is not the first study to show such problems in parents of hyperactive-impulsive or aggressive children. Many other studies have documented greater conflict in parent-child interactions (see Danforth, Barkley, & Stokes, 1991, for a review), greater parenting stress and reduced sense of efficacy or competence (Anastopoulos, Shelton, DuPaul, & Guevremont, 1992; see Fischer, 1990; Mash & Johnston, 1990, for reviews), greater psychological problems and distress in the mothers (Barkley, Anastopoulos, et al. , 1992; Befera & Barkley, 1985), and greater marital dissatisfaction and conflict as well as divorce in samples of hyperactive-impulsive children (Barkley, DuPaul, & McMurray, 1990; Befera & Barkley, 1985), particularly those with aggression or conduct disorder (Barkley, Fischer et al., 1990; Barkley, Fischer, Edelbrock, & Smallish, 1991; Loeber, 1990; Stormont-Spurgin & Zentall, 1995). Indeed, it appears to be the presence of aggression (oppositional-defiant symptoms) or conduct disorder in hyperactive children that accounts for most of the group differences on these measures (Anastopoulos et al., 1992; Barkley et al., 1992; Hinshaw, 1987). All of these studies employed clinic-referred children, most of whom were of school age. The present study serves to replicate and extend these findings to preschool-age children and to those selected from a community screening using a relatively brief parent rating scale.

As discussed earlier, ADHD, or its related AHII behavior patterns, seem to confer a differentially negative impact on performance of the demands of daily living more than on general cognitive or intellectual ability. That is, the impact of ADHD/AHII seems to be on the children's application of their intelligence in day-to-day adaptive functioning (Roizen et al., 1994; Stein et al., 1995), or in doing what one knows rather than in knowing what to do (Barkley, 1997a, 1997b). The finding of the present study that AHII children had significant delays in their adaptive functioning as assessed by the NABC is quite consistent with earlier research on this issue. And as those studies found, such performance deficits are well below those expected from the children's intellectual levels. Both Roizen et al. and Stein et al. suggested that the discrepancy between a child's standard score for general cognitive ability and that for the child's adaptive functioning may well be a useful indicator of social or adaptive impairment in hyperactive or ADHD children. The present study examined the utility of this concept of adaptive disability specifically by employing a formula used previously for the definition of learning disabilities (Reynolds, 1984) and more recently extrapolated to the definition of the concept of social disability in ADHD children (Green et al., 1996).

When this formula was used to classify AHII children as adaptively disabled or not, a number of significant findings emerged between these two AHII groups. Adaptively disabled AHII children (AHII + AD) were found to be significantly older than non-disabled AHII children (AHII - AD) and control children, who did not differ from each other in this respect. Such a finding is consistent with the results of the study by Roizen et al. (1994) that found the degree of IQ-adaptive disparity to be partly a function of age, with older children demonstrating greater disparities than young children. Such disparities may increase with age as a consequence of AHII or ADHD children not keeping pace with their peer group in the assumption of self-care, independence, family living, social communication, and other daily responsibilities despite adequate intellectual development for doing so.

In keeping with this failure to assume responsibility, more than twice as many AHII + AD children met clinical diagnostic criteria for conduct disorder (30.6%) than did AHII - AD (14%) or normal children (0%). Such a finding is in accord with the results of Greene et al. (1996) that found ADHD children defined as socially disabled to have higher rates of both conduct disorder and major depression. Group differences in the rates for major depression/dysthymia in the present study did not exceed the chosen level of

statistical significance ($p < .01$) but nearly did so ($p = .04$) with pairwise comparisons supporting a possible over-representation of mood disorder in the AHII + AD group. Moreover, parent ratings on the CBCL indicated significantly greater levels of aggression as well as thought problems and social withdrawal in AHII + AD children than in either AHII - AD or control children. And AHII + AD children manifested more pervasive behavior problems across multiple home settings and more severe behavior problems in these settings at both home and school. The parents of these adaptively disabled children also reported having more paranoia and using less positive parenting practices with their children than parents of nondisabled AHII or normal children. Such a finding for parenting practices would be expected in view of the higher rate of CD in AHII + AD children and the previously demonstrated association of poor parenting practices with CD (Loeber, 1990; Patterson et al., 1992).

Thus, adaptively disabled AHII children seem to be have a considerably higher likelihood than non-disabled AHII children of having more serious and pervasive behavioral problems, conduct disorder, and possibly mood disturbance. Given past longitudinal research identifying these characteristics as significant predictors of later maladjustment (Barkley, Fischer, et al., 1990; Loeber, 1990; Mannuzza et al., 1993), AHII + AD children would seem to be at substantially greater risk for later juvenile delinquency, substance experimentation and abuse, and academic failure and school disciplinary actions (e.g.,. suspensions, expulsions) than their nondisabled AHII counterparts. Indeed, using a related (though not identical) definition of social disability, Greene et al. (1997) found degree of social disability to predict some of the outcomes in their four year prospective follow-up study of ADHD children.

Both Roizen et al. (1994) and Stein et al. (1995), however, found that the IQ-adaptive disparities in ADHD children were not a function of comorbid disruptive behavior disorders like ODD or CD or the level of their symptoms. This implies that such disparities do not simply arise out of the child's negativity and refusal to obey parental demands for the assumption of adaptive responsibilities. Perhaps they are a direct consequence of the deficits in executive functioning and self-regulation that are inherent in ADHD, as Barkley (1997a, 1997b) has recently suggested, thereby disrupting the application of cognitive knowledge (knowing) in day-to-day performance and self-governance (doing). The finding of even higher levels of both parent and teacher rated inattention (which Barkley attributed to poor executive functioning by internally represented information) in the AHII + AD group than the other two groups would be in keeping with this possibility. Nevertheless, the additional presence of CD among a sizable minority of adaptively disabled AHII children, and ODD among most children in both AHII groups, would seem to further interfere with the child's assumption of responsibilities for personal and social self-sufficiency beyond that contributed by ADHD alone.

Several limitations of the present study must be borne in mind in considering its results. One such limitation was the fact that the AHII sample represented not simply children who were screened as having significant elevations in this behavior pattern but also having parents who were willing to enter the children into an early intervention project. Consequently, this sample may not be representative of the larger population of AHII preschool children.

A second limitation pertains to the inability to keep the research assistants conducting the classroom observations completely blind to the group membership of those children who were observed in the special treatment classrooms. Approximately half of the AHII children were assigned to these special psychosocial treatment classrooms. All of the children in those special classrooms were AHII and so observers knew automatically from going to this special class what the group membership of these children happened to be. Likewise, the teachers trained to work in this classroom who provided the initial teacher ratings of these AHII children were aware of their membership in the AHII group. This may have resulted in some bias in the observations or ratings, respectively, that might have contributed to the group differences found here. However, this would not explain the fact the AHII children were also observed in the clinical evaluation to

demonstrate more behavioral problems by observers who were kept blind to their group membership. Nor would this explanation account for any of the differences found between the AHII + AD and AHII - AD subgroups of AHII children given that observers/teachers/examiners in this study were unaware of this subgrouping procedure at the time of data collection.

A further limitation of this study was that the differences between adaptively disabled and nondisabled ADHD children may partly have been an artifact of using a common source of reporting for both the independent (NABC) and some of the dependent measures, in this case, primarily the mothers of the subjects. While this cannot be entirely discounted as an explanation of some of these findings, it would not explain the group differences found on measures relying on a different source for information (e.g., teachers, examiners, classroom observers). These and other limitations may have compromised the methodology and hence the internal or external validity of the study to some degree. Nevertheless, the fact that most of the findings in this study are consistent with other studies of hyperactive, ADHD, or AHII children suggests that the results may be reliably associated with this behavior pattern in this preschool age group.

In summary, the present study found that a large group of preschool-children identified as having significantly elevated patterns of aggressive-hyperactive impulsive-inattentive (AHII) behavior at registration for kindergarten were subsequently found to demonstrate a variety of behavioral, emotional, social, cognitive, and academic difficulties relative to a community control group. Their parents (primarily mothers) reported having significantly greater psychological problems, parent-child conflicts, and parenting stress as well as lower levels of parenting sense of competence and marital satisfaction than parents of children in the control group. By and large, these results continue to support prior research that has identified preschool children with high levels of AHII behavior to be significantly impaired across multiple domains of functioning and therefore at high risk for a variety of future negative outcomes and for greater mental health and educational service utilization. The present study went even further than past research, however, in suggesting the utility of a psychometric definition of adaptive disability as a useful marker for even greater current and future risks that may be associated with AHII behavior in preschool children. Significant disparity between expected and actual adaptive functioning in preschool AHII children was found to identify children at greater risk for conduct disorder and aggression, greater behavioral problems and self-control deficits at school, greater inattention at home and school, poorer math achievement skills, more severe and pervasive behavior problems across multiple home and school settings, and more deficient parenting practices than AHII children without adaptive disability. Thus, the concept of adaptive disability may have some utility in subgrouping AHII (and probably ADHD) children for purposes of determining risk for other domains of maladjustment. Future studies of ADHD/AHII children are therefore encouraged to further study the utility of this concept of adaptive disability.

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